

mittee and of others interested will be directed in the second part of this report.

Dr. Murie confirms what has often been stated for other localities, viz. that the shrimpers destroy enormous quantities of the younger members of valuable species of flat fish. Whether the destruction alluded to is justified by the apparently unfailing perennial abundance of the brood fishes is doubtful. As has been pointed out by Dr. Petersen, there may be plenty of eggs and young fry of a given species, and yet the number of the larger and relatively much more valuable fishes may be seriously declining, as is maintained by many to be the case with plaice and soles. The question rather is whether the little flat fishes which escape the shrimpers in the Thames Estuary are numerous enough to replenish the stock of the larger fishes in the deeper waters off shore. In this connection local interests ought to be subordinated to those of the country in general, and therein seems to lie the danger of a too concentrated attention to purely local interests to which sea fisheries committees are naturally liable.

#### A STUDY OF GENIUS.

*A Study of British Genius.* By Havelock Ellis. Pp. xiv + 300. (London: Hurst and Blackett, Ltd., 1904.) Price 7s. 6d. net.

MR. HAVELOCK ELLIS points out that owing to the completion of the "Dictionary of National Biography" it has at last become possible to obtain a comprehensive view of the men and women who have built up English civilisation, and in order to ascertain the composition of these elements of intellectual ability which the British Islands have contributed to the world, and as a help to the study of the nature of genius generally, he has freely made use of this monumental work. The author took as a basis of eminence those to whom at least three pages are devoted in the "Dictionary," but he also included some about whom less was said if they had shown intellectual ability of a high order, and conversely he eliminated those about whom much was written if they did not possess intellectual ability. The final selection yielded 975 British men of a high degree of intellectual eminence and 55 women. These 1030 persons are discussed from various points of view, and in appendices lists are given of their names, their activities, their places of origin, the occupation of their fathers, and other data.

Apparently the counties that have contributed most largely to the making of English men of genius are Norfolk, Suffolk, Hertfordshire, Warwickshire, Worcestershire, Herefordshire, Buckinghamshire, Cornwall, Dorsetshire, Oxfordshire and Shropshire; perhaps Somerset, Devonshire, Gloucestershire, Wiltshire and Essex should be added to this list. Mr. Havelock Ellis recognises three great foci of intellectual ability in England:—(1) the East Anglian focus; (2) the south-western focus; and (3) the focus of the Welsh Border. The first of these is the most recent and the most mixed ethnologically, as East

Anglia is very open to invasion, and all kinds of foreigners have settled there. The second is the largest and the oldest, and the population has much darker hair; it may be called the Goidelic-Iberian district. The district is defended by Wansdyke and Bokerley Dyke. The third is termed the Anglo-Brythonic district. The Anglo-Danish part of England—Lincolnshire, Nottinghamshire, Derbyshire, Yorkshire, and thence into Scotland—has its own peculiar anthropological characters. Its children have usually been more remarkable for force of character than for force of intellect. East Anglia is productive of great statesmen, ecclesiastics and scholars, and of musical composers and painters. It has no aptitude for abstract thinking; its special characters seem to be humanity, patience, grasp of detail, and love of liberty. The people of the south-western focus are sailors rather than scholars, and courtiers rather than statesmen; they are innovators and pioneers in the physical and intellectual worlds, and, above all, are impressive, accomplished, and irresistible personalities. The genius of the Welsh Border is artistic in the widest sense, and notably poetic; there is a tendency to literary and oratorical eloquence, frequently tinged with religious or moral emotion, and there are no scientific men of the first order. The genius of Scotland has been mainly produced by the tract between the Cheviots and the Grampians.

In science Scotland stands very high, Ireland extremely low. It is in the exact sciences that the Anglo-Dane triumphs; but the science of the district is not exclusively mathematical, and geology especially owes much to the Anglo-Dane. The East Anglian is a natural historian in the widest sense, and shows little or no mathematical aptitude. It is not easy to see anything specific or definitely Brythonic in the scientific activities of the Welsh Border; at most it may be said there is some tendency for science here to take on a technological or artistic character. The scientific characters of the south-western focus are quite clear; what we find here is the mechanical impulse, and more especially the physiological temper; inventors are numerous.

This is only one of the various subjects dealt with in this interesting book; in the chapter on heredity and parentage we find it stated that inheritance of ability is equally frequent through father and mother; genius-producing families are apt to be large, and the men of ability tend to be the offspring of predominantly boy-producing parents, and perhaps women of ability tend to belong to girl-producing parents. There is a tendency for men of ability to be either the youngest or more especially the eldest of the family. The fathers of our eminent persons have been predominantly middle-aged or even elderly, while the mothers have been at the period of greatest vigour and maturity.

Eminent persons have frequently shown marked constitutional delicacy in infancy and early life, but many developed quite exceptional physical health and vigour. The chief feature in childhood, brought out by the present data, is precocity, and this character is discussed at some length. The relation of eminence to patho-

logical conditions is duly considered, and Mr. Havelock Ellis summarises his conclusions as follows:—

"We cannot, therefore, regard genius either as a purely healthy variation occurring within normal limits, nor yet as a radically pathological condition, not even as an alternation—a sort of allotropic form—of insanity. We may rather regard it as a highly sensitive and complexly developed adjustment of the nervous system along special lines, with concomitant tendency to defect along other lines. Its elaborate organisation along special lines is often built up on a basis even less highly organised than that of the average man. It is no paradox to say that the real affinity of genius is with congenital imbecility rather than with insanity."

The criticism will doubtless be made that in many cases the individuals dealt with by Mr. Ellis are too few in number to give trustworthy results; but this is a matter that was beyond his control, and no one can say that he has not made the most of available material.

#### TEXT-BOOKS OF PHYSICAL CHEMISTRY.

*Introduction to the Study of Physical Chemistry.* By Sir William Ramsay, K.C.B., F.R.S. Pp. 48. (London: Longmans, Green and Co., 1904.) Price 1s. net.

*The Phase Rule and its Applications.* By Alex. Findlay, M.A., Ph.D., D.Sc. Pp. lxiv + 313. (London: Longmans, Green and Co., 1904.) Price 5s.

IT will be readily admitted that there is on the part especially of our younger chemists, a growing appreciation of the methods and results of physico-chemical investigation, and the issue of a series of text-books of physical chemistry under the able supervision of Sir William Ramsay will be a welcome stimulus to the prosecution of study and research on these lines. Dr. Findlay's book on the phase rule is the first of the series, and other volumes are promised, dealing respectively with stoichiometry, relation between chemical constitution and physical properties, electrochemistry, spectroscopy, thermodynamics, chemical dynamics and reactions. The advance being made in some of these departments is much more rapid than in others, and the plan of having a volume for each branch of the subject will make frequent revision possible where there is a call for it.

Taken altogether, these volumes will be an acceptable addition to our chemical literature, for up to now the English student of physical chemistry has been dependent chiefly on translated text-books for detailed treatment of certain advanced portions of the subject. One or two of the promised volumes, it is true, will cover well trodden ground, but they are requisite in the interests of the treatise as a whole, and the editor will doubtless see that harmony and uniformity are preserved in the several parts. He has written a general introduction to the series, giving a rapid survey of the main lines along which the development of physical chemistry has proceeded, and indicating the scope of the subjects to be dealt with in the special volumes.

The mere mention of the phase rule usually strikes dismay in the heart of the non-mathematical chemist,

but it may be said at once that Dr. Findlay's treatment of the subject is almost entirely descriptive. The phase rule can be formulated in a simple enough manner, and its application can be appreciated even by those who may not feel at home with Willard Gibbs. Its merit is that it has rendered possible the classification of the various kinds of equilibria on a rational and scientific basis. The parallelism between many cases of physical and chemical equilibrium becomes intelligible; the phenomena of polymorphism, as exhibited, for example, by sulphur, tin, and benzophenone, can be treated systematically, and the conditions of stability of various polymorphic forms can be definitely formulated; the equilibrium between solid and liquid in binary systems can be fully interpreted, even when the two components form mixed crystals. In the exposition of these and many other points Dr. Findlay has done excellent work, and he has succeeded in producing an interesting and comprehensive estimate of the value of the phase rule in the classification and interpretation of equilibrium phenomena.

It is a very gratifying feature of the book that it contains full and up to date references to original work, and it is to be hoped that this feature will be prominent also in the subsequent volumes. After all, the best text-book can serve only to introduce the student to the actual workers in his science, and the more of such contact the better. Dr. Findlay has very properly been liberal in the reproduction of figures, for the exposition of the phase rule would be a difficult task indeed without those graphical methods of representation that have been so characteristic of its application. Tables of numerical data, taken from original papers, are abundant, and assist materially in the realisation of the actual experimental groundwork.

As a result of the physicochemical activity of the last twenty years, and of the corresponding introduction of mathematical methods of treatment, more demands than formerly are made on the reasoning powers of the chemical student. This is probably true also in connection with the phase rule, but no one who considers the material collected by Dr. Findlay will doubt that the application of these exact methods has secured a rich harvest of coordinated knowledge.

J. C. P.

#### OUR BOOK SHELF.

*Notes on Electric Railway Economics and Preliminary Engineering.* By W. C. Gotshall. Pp. iv + 251. (New York: McGraw Publishing Co., 1903.)

*Engineering Preliminaries for an Interurban Electric Railway.* By E. Gonzenbach. Pp. 71. (New York: McGraw Publishing Co., 1903.)

THE economic side of engineering is one which the student is generally left to pick up as best he can on his way through life. Little attention is paid to it as a rule in the course of his technical training, and it is not until he starts on practical commercial work that he begins to realise that pounds, shillings and pence enter as much into the engineer's formulæ as the fundamental units of length, mass and time. These two books should be very useful, therefore, not only to the budding electric railway engineer, but also to all students of engineering, as serving to show the many